

EXERCISE ASSEMBLY FOR THE UPPER BODY

BACKGROUND OF THE INVENTION

Field of the Invention

This invention is directed to an exercise assembly for working the upper body and is specifically, but not exclusively, intended for use by an invalid or other mobility limited individual, such as when seated in a wheelchair or other support. Hand grips are accessible to and linearly movable by the individual in a push/pull manner, along a track assembly configured to provide the intended motion to the hands, arms, shoulders, etc. of the user. A movement restricting force is applied to the hand grips so as to vary the amount of force required of the user in moving the hand grips.

DESCRIPTION OF THE RELATED ART

In modern day society routine exercise has become increasingly popular as a means to lose weight, maintain muscles and provide for better overall health. Numerous exercise devices are currently available to an individual, depending upon the goals one wishes to attain. In addition to common, cardiovascular exercises such as running, jogging, walking, the exercise industry has developed numerous machines and exercise equipment. Such known devices are designed and structured to either exercise the entire body by the performance of various prescribed exercise procedures. In

1 addition, specialized exercise devices are available which are
2 structured to concentrate on certain parts of a person's body.

3 Before the existence of present technological advancements,
4 perhaps the most common exercise equipment comprised "free
5 weights". As such, a plurality of different barbells and like free
6 weight structures were used in combination with specific exercises
7 in an effort to develop the arms, legs, shoulders and various other
8 parts of the human body. However, for years free weights and a
9 majority of the exercise equipment which was made commercially
10 available was designed for individuals having the full use of their
11 entire body. Except recently, relatively few exercise machines or
12 like equipment was available for use by individuals with some type
13 of physical handicap. More specifically, individuals suffering
14 from spinal cord injuries and having lost the use of the legs or
15 lower part of the body are typically restricted to travel by means
16 of a wheel chair or like manual or motorized propulsion device.
17 Further, such individuals were significantly restricted from using
18 conventional, full body or specialized exercise equipment which was
19 originally intended for use by individuals not having a physical
20 handicap.

21 Because of the recognized need of the handicapped for exercise
22 and/or therapy, there currently exists numerous exercise machines,
23 specialized devices the like equipment which is specifically
24 intended for use by physically challenged individuals. Such
25 individuals commonly have the free use of the arms, hands,

1 shoulders, and upper torso above the waist. However, it has
2 recently been determined that a significant amount of the currently
3 and commercially available exercise devices intended for the
4 handicapped provide a type of exercise which is less than totally
5 beneficial. By way of example, the majority of the restricted
6 exercise equipment are designed to provide a "arm cranking" or arm
7 ergometry exercise procedures in order to develop and maintain and
8 rehabilitate the muscles of the upper part of the body.
9 Unfortunately, participation in these activities have been
10 associated with increased incidences of upper extremity injuries
11 and pain. Moreover, medical professionals have suggested that the
12 movement pattern and muscle recruitment involved in these arm
13 cranking or continuous rotational movements involve an excessive
14 shoulder pressing action in an internally rotated position. The
15 result is the production of an unbalanced stress and a repetitive
16 use syndrome.

17 To the contrary, several pieces of conventional and existing
18 exercise equipment not capable of being used by invalids or other
19 physically restrictive individuals offer a lower body cycling
20 motion concurrently with a reciprocal press/pull arm action. Such
21 devices include various exercise bicycles and elliptical runner
22 systems. The action provided with such systems is further
23 characterized by linear hand movement. These system provide a much
24 greater shoulder range of motion than the rotational arm cranking
25 procedure as described above. In addition shoulder extension

1 resulting from pulling the arm past the mid-line of the body is
2 also extremely beneficial. The muscles involved in such pulling
3 actions include the latissimus dorsi, rhomboids, rear deltoid and
4 rotator cuff muscles. Obviously, persons with significant torso
5 disabilities are not able to use such system. As a result, the
6 aforementioned muscle groupings are typically under developed and
7 without significant resting tone when the user is restricted to a
8 wheel chair.

9 Accordingly, there is a significant need in the exercise
10 industry for an exercise assembly specifically, but not
11 exclusively, intended for use by handicapped individuals of the
12 type set forth above. Such an improved exercise assembly should be
13 able to provide linearly directed push/pull motions of the arms,
14 shoulders, etc. rather than the aforementioned arm cranking motion.
15 Also, a preferred exercise assembly should be readily adaptable in
16 terms of positioning, dimensioning and overall structural
17 configuration for use by individuals who are primarily oriented in
18 a seated but substantially upright position, such as when the
19 individual is supported in a wheel chair. Moreover, a preferred
20 and improved exercise and rehabilitation device should be
21 structured to provide linear and reciprocal action arm movement
22 while in a seated position.

23 24 SUMMARY OF THE INVENTION

25 The present invention is directed to an exercise assembly for

1 exercising muscles of a user's upper body. More specifically, the
2 exercise assembly of the present invention is particularly, but not
3 exclusively, intended for use by individuals having restrictive use
4 of the lower part of the body and as such may be required to use a
5 wheelchair for mobility. Therefore, an important feature of the
6 exercise assembly of the present invention, as will be described in
7 greater detail hereinafter, is the provision of an exercise motion
8 which provides linear action due to reciprocal arm movement while
9 the use or individual is in a seated position.

10 In accomplishing the intended goals, the exercise assembly of
11 the present invention comprises a frame including a base disposed
12 on a supporting surface. The frame also includes a track assembly
13 connected to and supported by the base. The base, and/or a
14 cooperative portion of the frame is adjustably connected or
15 attached so as to vary the height of at least the track assembly
16 relative to the supporting surface. The subject exercise assembly
17 is thereby adaptable to an individual of varying size, which may be
18 restricted to utilizing wheelchairs of various sizes, shapes, etc.
19 In addition, the track assembly includes an open substantially
20 front end portion and a closed end located at a rear or trailing
21 portion of the frame and being oppositely disposed to the open end
22 of the track assembly. Moreover, the track assembly comprises two
23 track segments extending from the open end to the closed end and as
24 such are collectively disposed in a substantially convergent
25 configuration. Each of the track segments are elongated, linear,

1 hollow and have a substantially equal longitudinal dimension.

2 A carriage assembly is reciprocally and linear movable along
3 the track assembly and as such includes two hand grips readily
4 accessible to the user when the user is disposed in an operative
5 position. Generally speaking, the operative position of the
6 individual may be defined by a location substantially on the
7 "interior" of the track assembly or at a location which is between
8 the spaced apart converging track segments at least in the vicinity
9 of the open end thereof. Therefore, the open end of the track
10 assembly must be sufficiently dimensioned to allow disposition of
11 the user, while in the preferred, seated but upright orientation.
12 In such an operable position the hands of the user can easily grasp
13 different ones of the hand grip.

14 The carriage assembly more specifically includes two carriages
15 each structured to support and be fixedly connected to one of the
16 two hand grips. In turn, each of the carriages are movably
17 connected to a different one of the track segments so as to be
18 capable of the aforementioned and preferred linear and reciprocal
19 motion along the respective track segments. As will be described
20 in greater detail hereinafter, each carriage is structured to be
21 movably connected within the interior of the respective track
22 segment, while having an outer, exterior, shell-like portion to
23 which corresponding ones of the hand grips are mounted.

24 One additional feature of the present invention is the
25 provision of a resistance assembly which is interconnected between

1 the two carriages and otherwise structured to provide a movement
2 restricting force thereon. Such a restrictive force offers
3 resistance to the reciprocal, linear motion of the hand grips along
4 their respective track segments and therefore requires a user or
5 individual to exercise the intended muscle grouping to cause the
6 continuous travel of the hand grips along their respective track
7 segments. Moreover, the resistance assembly includes an elongated
8 line, cable, belt, etc. extended along a predetermined path of
9 travel at least partially defined by the lengths of the individual
10 track segments. As also will be discussed in greater detail, the
11 line preferably includes a continuous or closed configuration.
12 While continuous, the line is adjustable and/or separable at one or
13 more locations along its length such that the relative positions of
14 the carriages and the corresponding hand grips are adjustable
15 relative to one another. Access to and the intended concurrent
16 reciprocal motion of the hand grips, as performed by the user is
17 thereby facilitated.

18 The aforementioned predetermined path of travel is further
19 defined by a plurality of pulleys or rollers disposed along the
20 length of the path in movable engagement with the line. In
21 addition, the resistance assembly further includes a resistance
22 mechanism preferably in the form of a roller. The resistance
23 mechanism or roller can be rotated in opposite directions to
24 accommodate the reciprocal movement of the line and the carriages
25 and hand grips attached thereto. Also, the resistance to such

1 reciprocal rotation of the resistance roller may vary in order to
2 selectively and adjustably determine the amount of resistance
3 placed on the line and accordingly the amount of restrictive force
4 required to reciprocally "push and pull" the hand grips by the
5 user. A number of adjustable resistance producing structures may
6 be utilized in cooperation with the resistance roller mechanism
7 such as friction engaging implements, adjustable gearing, or other
8 mechanical or hydraulic devices.

9 Therefore, operation of the exercise assembly of the present
10 invention as intended, provides a user with a linearly acting
11 reciprocal arm movement while in a seated but substantially upright
12 position, such as in a wheelchair. Further, the individual and
13 the wheelchair or other means of support may be disposed in an
14 operable position, partially within the "interior" of the track
15 assembly in the specific vicinity of the open end thereof. The
16 preferred exercising procedure involves gripping each of two hand
17 grips associated with different ones of the track segments and
18 providing alternating, linear, reciprocating, push/pull motion
19 which serves to best exercise the intended muscle grouping in a
20 preferred manner. The problems and disadvantages associated with
21 the aforementioned rotary or "arm cranking" motion are thereby
22 overcome. Further, in order to facilitate the performance of such
23 a preferred exercising motion, the track assembly may be supported
24 on the base at a predetermined inclination of preferably, but not
25 necessarily, 18 to 20 degrees.

1 These and other objects, features and advantages of the
2 present invention will become more clear when the drawings as well
3 as the detailed description are taken into consideration.

4
5 BRIEF DESCRIPTION OF THE DRAWINGS

6 For a fuller understanding of the nature of the present
7 invention, reference should be had to the following detailed
8 description taken in connection with the accompanying drawings in
9 which:

10 Figure 1 is a front perspective view of the exercise assembly
11 of the present invention

12 Figure 2 is a side view of the embodiment of Figure 1 in
13 schematic form.

14 Figure 3 is a sectional view taken along line 3-3 of Figure 1.

15 Figure 4 is a schematic representation showing both operative
16 and structural features of the exercise assembly of the present
17 invention.

18 Like reference numerals refer to like parts throughout the
19 several views of the drawings.

20
21 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

22 As shown in the accompanying drawings, the present invention
23 is directed to an exercise assembly generally indicated as 10 and
24 including a frame generally indicated as 12 having a base 14. The
25 frame 12 further includes a track assembly generally indicated as

1 16 including a plurality of track segments, preferably two in
2 number respectively indicated as 18 and 20. The track segments 18
3 and 20 are linear and have a hollow configuration along at least a
4 majority of the length thereof as demonstrated in Figure 3. The
5 base 14 supports the remainder of the frame 12, including the track
6 assembly 16 on any of a number of different supporting surfaces 22.
7 The base 14 and a remainder of the frame 12 is cooperatively
8 structured to be height adjustable as indicated by directional
9 arrow 24. As such, the base 14 may include telescopic sections 26
10 and 28 adjustable vertically relative to the supporting surface 22
11 either by the use of hydraulics or mechanics, as is well known in
12 the art.

13 The track assembly 16, including the two track segments 18 and
14 20 define a front, substantially open end of the frame 12 as at 30
15 and a closed or rear end of the frame 12 generally indicated as 32.
16 Accordingly, the track segments 18 and 20 are cooperatively
17 configured into a convergent configuration as they extend from the
18 front portion or open end 30 to the rear end or closed portion 32
19 of the track assembly 16. Further, the track segments 18 and 20
20 are disposed in a substantially coplanar orientation with one
21 another and are collectively disposed at an incline as demonstrated
22 in Figure 2. While not limited to a specific angle of inclination,
23 a most preferred angle of inclination would be generally about 18
24 to 20 degrees in order to best facilitate operation of the exercise
25 assembly 10 in the intended fashion.

1 As set forth above the exercise assembly 10 is specifically,
2 but not exclusively, designed for use by an individual disposed in
3 a seated but substantially upright orientation, such as the
4 orientation actually assumed when seated in a wheelchair or other
5 support means. Accordingly, the open end 30 of the front portion
6 of the frame 12 must be at least sufficiently dimensioned, in terms
7 of the spacing between the proximal ends 18' and 20' of the track
8 segments 18 and 20 to allow receipt and/or passage and positioning
9 of the user on the "interior" 36 in the vicinity of the open end 30
10 and between the proximal ends 18' and 20'. When in this operable
11 position, the user has free and easy access to two hand grips 40
12 and 42.

13 The hand grips 40 and 42 comprise an operable part of a
14 carriage assembly. The carriage assembly further comprises two
15 carriages 44 and 46, the details of which are disclosed in greater
16 detail in Figure 3, with specific reference to the carriage 46.
17 While reversely oriented, the carriages 44 and 46 are each
18 connected in supporting relation to the different hand grips 40 and
19 42 and are otherwise identically structure. Therefore, with
20 primary reference to Figure 3 the hand grip 46 includes a roller
21 assembly comprising at least one but preferably a plurality of
22 rollers 50, 51 and 52. The rollers are mounted within and
23 structured to travel along the hollow interior of the respective
24 track segments as at 20. Further, each of the rollers 50, 51 and
25 52 are disposed, dimensioned and structured to rotationally engage

1 interior portions of the respective track segments 18 and 20 which
2 are more specifically defined by inwardly directed or extending
3 rails 53, 54 and 55. The roller assembly is mounted as a unit
4 which is fixedly secured to a depending flange portion 56 of the
5 carriage 46. The remainder of the carriage 46 comprises a shell-
6 like configuration, as at 58 which is disposed exteriorly of the
7 track segment 20 and in at least partially or substantially
8 surrounding and enclosing relation to a portion thereof as
9 demonstrated. Each of the carriages 44 and 46 may include a flat
10 or support platform as at 60 for supporting attachment to a
11 corresponding one of the hand grips schematically indicated in
12 phantom as 42. It should be apparent that the cooperative
13 disposition of the inwardly directed rails 53, 54 and 55 and their
14 engagement with the respected rollers 50, 51 and 52 cause a secure
15 but linearly movable engagement of each of the carriages 44 and 46
16 both interiorly and exteriorly of the respected track segments 18
17 and 20.

18 With primary reference to Figure 4 structural and operative
19 features of the exercise assembly 10 are schematically
20 demonstrated. More specifically the exercise assembly 10 includes
21 a resistance assembly comprising an elongated line, cable, belt,
22 etc. 70. The line 70 extends along a predetermined path of travel
23 which is partially defined by the two track segments 18 and 20 as
24 correspondingly positioned lengths of the line 70 are mounted
25 within and movable along an interior portions of the respective

1 track segments 18 and 20. The predetermined path of travel of the
2 line 20 is further defined by appropriately disposed rollers or
3 pulleys 72 and 74 located within and substantially adjacent to the
4 proximal end and 18' and 20' of the track segments 18 and 20.
5 Additional guiding pulleys or rollers 76 and 78 are disposed
6 adjacent the closed end 32 of the track assembly 16 at the rear
7 portion thereof as described above. Further, the pulleys 76 and 78
8 are located exteriorly of the track segments 18 and 20.

9 The path of travel of the line 70 is further defined by the
10 inclusion of a resistance mechanism or resistance roller 73 which
11 engages a correspondingly positioned length of the line 70 as at
12 70'. Movable engagement between the line segment 70' and the
13 resistance mechanism or roller 73 provides a movement restrictive
14 force on the line 70. Such a restrictive force in turn causes the
15 user of the exercise assembly 10 to exert a comparable force on the
16 hand grips 40 and 42 in order to accomplish the intended linear,
17 reciprocal, push/pull motion by the arms, shoulders, etc. of the
18 upper torso of the user.

19 With reference to Figure 1 a housing as at 76 includes a
20 resistance exerting mechanism (not shown for purposes of clarity)
21 which may take a variety of different configurations and be
22 cooperatively structured with the resistance mechanism or roller 73
23 to provide the aforementioned movement restricting force on the
24 line 70 during its reciprocal movement. Further the resistance
25 exerting device within the housing 76 is adjustable by means of

operative positioning of a lever 78. Depending upon the orientation of the lever 78 a selective amount of resistance will be placed on the line 70. The user is thereby capable of adjusting the force required to reciprocally move the hand grips 40 and 42 over their intended linear paths along the track segments 18 and 20. A variety of different resistance exerting devices may be enclosed within the housing 76. Such devices may include friction engaging devices, gear assemblies other hydraulic or mechanical operative devices known in the art. Such devices are cooperatively structured with the pulley 72 to vary the amount of restrictive force placed on the line 70 and required to reciprocally move the hand grips 40 and 42 in the manner described.

With further referenced to Figure 4 it is seen that the line 70 has a substantially continuous or closed configuration as it is disposed along the aforementioned path of travel defined by the roller 72, 74, 76, 78 and the resistance mechanism roller 73. Such a closed or continuous configuration is further defined by the line 70 being attached to the respective carriages 44 and 46 and/or the roller assemblies associated therewith, as described in Figure 3 at points 80 and 81 as demonstrated. Also in order to vary the overall length of the line 70 and/or vary the position the carriages 44' and 46' relative to one another at different locations an adjustment assembly is provided and generally indicated as 90. The adjustment assembly 90 includes means to disconnect portions of the line 70 from one another and/or

1 reconnect the separated portions at different locations such that
2 the positions of the hand carriages and hand grips may vary, as set
3 forth above.

4 As indicated by the directional arrows 92, 94 and 96 the line
5 70, while in the aforementioned closed or continuous configuration
6 and oriented along the predetermined path of travel continuously
7 move at a reciprocal manner as the user of the device, operatively
8 positioned on the interior 36 adjacent the open end 30, alternately
9 exerts a push/pull force on each of the hand grips 40 and 42
10 resulting in the preferred and intended linear, reciprocal motion
11 best suited to accomplish the intended exercise and/or
12 rehabilitation.

13 Since many modifications, variations and changes in detail can
14 be made to the described preferred embodiment of the invention, it
15 is intended that all matters in the foregoing description and shown
16 in the accompanying drawings be interpreted as illustrative and not
17 in a limiting sense. Thus, the scope of the invention should be
18 determined by the appended claims and their legal equivalents.

19 Now that the invention has been described,